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ABSTRACT

Drawings, accompanied by text and recommended measurements, illustrate school building requirements necessary for handicapped persons to enter, leave, and circulate in buildings without assistance. The information is intended to be used in the design of new buildings and the remodeling of existing facilities. General design information covers the topics of reach dimension, circulation space, wheel chair data, and hazards. More specific information concerns planted trees, gardens, recommended surfaces of walks and floors, footways, ramping of sidewalks, access, entrances and doorways, corridors, long ramps, stairs, handrails, doors, latrines, and lighting and acoustics. (MLF)

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ED226400

# EDUCATIONAL BUILDING DIGEST 14

UNESCO REGIONAL OFFICE FOR EDUCATION IN ASIA AND THE PACIFIC
G. P. O. BOX 1425, BANGKOK, THAILAND

## DESIGN GUIDE FOR BARRIER-FREE SCHOOLS

U.S. DEPARTMENT OF EDUCATION
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## INTRODUCTION

- 1/10 OF THE POPULATION, IRRESPECTIVE OF RACE, NATIONALITY OR LOCATION, ARE DISABLED. THEY ARE SPREAD THINLY, OVER A WIDE AREA.

- FOR FULL PARTICIPATION BY THE DISABLED, THE COMMUNITY HAS TO OFFER THEM BARRIER-FREE SITES. THE SPECIAL NEEDS OF DISABLED CHILDREN SHOULD BE TAKEN INTO ACCOUNT IN THE DESIGN AND PLANNING OF SCHOOL BUILDINGS.

- EXISTING FACILITIES HAVE TO BE CHANGED OR ADAPTED SO THAT HANDICAPPED PERSONS CAN ENTER, LEAVE AND CIRCULATE IN THE BUILDINGS WITHOUT ASSISTANCE.

- THOSE WHO ARE AFFECTED BY ARCHITECTURAL BARRIERS CAN BE DIVIDED INTO FOUR GROUPS
  1. WHEEL CHAIR PERSONS
  2. AMBULANT DISABLED PERSONS
  3. VISUALLY HANDICAPPED
  4. THE HEARING-IMPAIRED

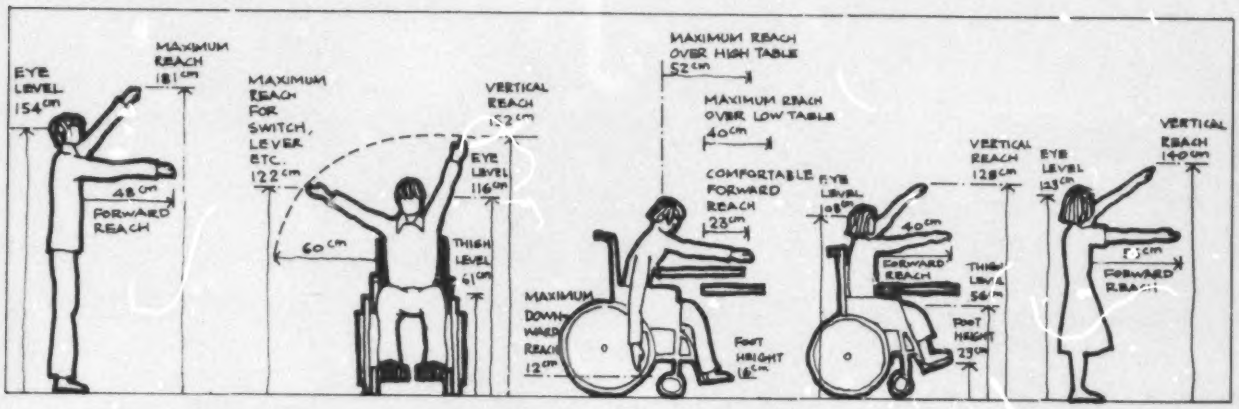
  BUT EMPHASIS ON INDIVIDUAL DIAGNOSIS, EVALUATION AND PROGRAMMES RATHER THAN CLASSIFICATION BY LABEL OR GROUP CATEGORY, IS MOST IMPORTANT.

- THE INFORMATION PROVIDED IN THIS DIGEST IS RELATED PRINCIPALLY TO THE DESIGN OF ACCESS TO BUILDINGS BY PHYSICALLY DISABLED PUPILS AND STUDENTS WHO ARE ABLE, WHEN ATTENDING SCHOOLS AND COLLEGES, TO MAKE USE OF ORDINARY TEACHING ACCOMMODATION. IT DOES NOT COVER DESIGN TO MEET ANY SPECIALIZED EDUCATIONAL PROGRAMMES OR CARE REQUIREMENTS OF THE HANDICAPPED.

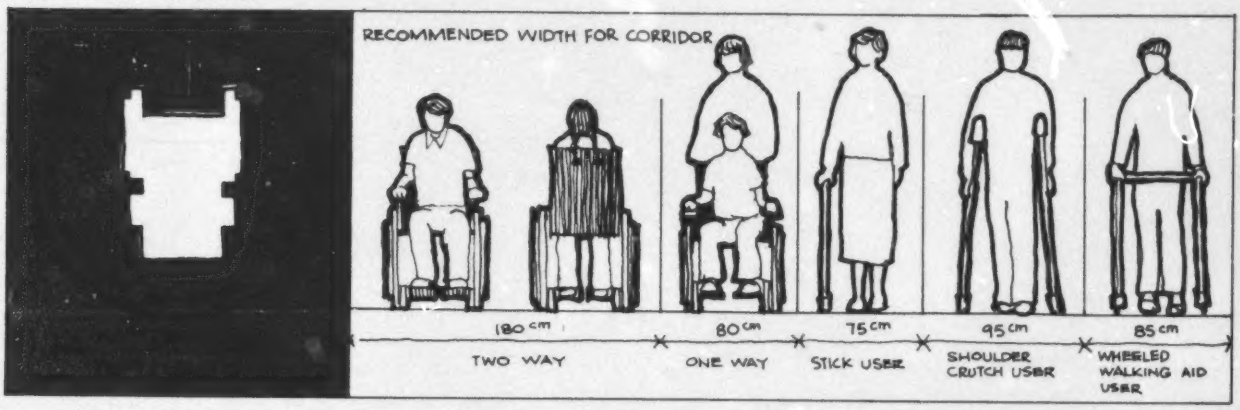
EA 014 696

# GENERAL DESIGN INFORMATION

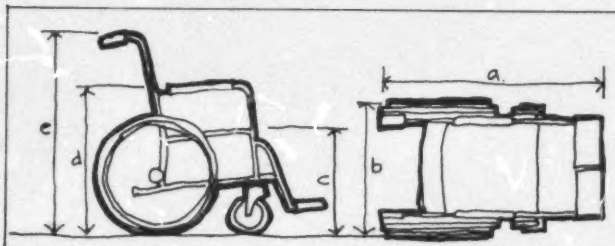
## REACH DIMENSION


EYE LEVEL 154 cm
MAXIMUM REACH 181 cm
48 cm FORWARD REACH
MAXIMUM REACH FOR SWITCH, LEVER ETC. 122 cm
VERTICAL REACH 152 cm
EYE LEVEL 116 cm
60 cm
THIGH LEVEL 61 cm
MAXIMUM REACH OVER HIGH TABLE 52 cm
MAXIMUM REACH OVER LOW TABLE 40 cm
COMFORTABLE FORWARD REACH 28 cm
MAXIMUM DOWNWARD REACH 12 cm
FOOT HEIGHT 16 cm
EYE LEVEL 108 cm
40 cm FORWARD REACH
VERTICAL REACH 128 cm
THIGH LEVEL 56 cm
FOOT HEIGHT 23 cm
EYE LEVEL 133 cm
VERTICAL REACH 140 cm
FORWARD REACH

## CIRCULATION SPACE



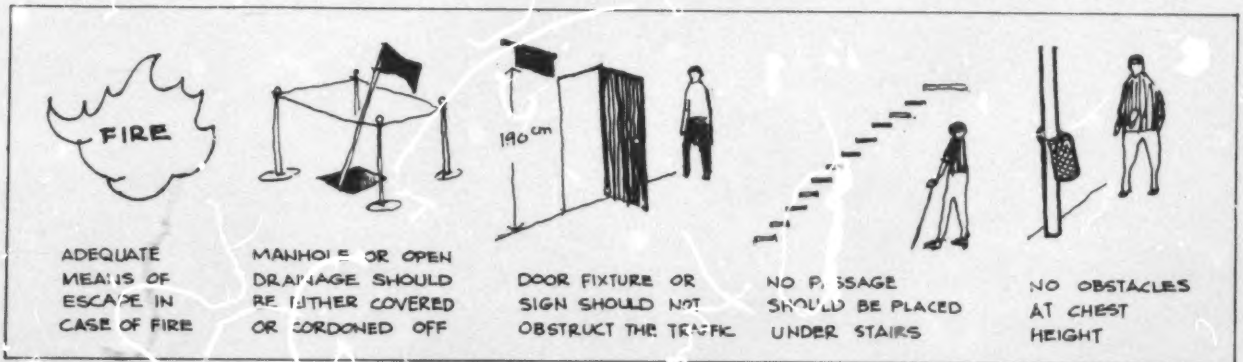

## WHEEL CHAIR DATA




| | ADULT WHEEL CHAIR | JUNIOR SIZE WHEEL CHAIR |
|---|---|---|
| a. LENGTH | 98 - 106 cm | 94 cm |
| b. WIDTH | 61 - 71 cm | 47 cm |
| c. HEIGHT OF SEAT | 48 - 52 cm | |
| d. HEIGHT OF ARMREST | 71 - 76 cm | |
| e. HEIGHT OF HANDLE | | 84 cm |

## HAZARD

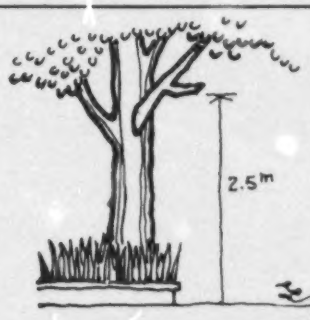
EVERY EFFORT SHOULD BE MADE TO ELIMINATE HAZARDS FOR THOSE PERSONS WITH PHYSICAL DISABILITIES


FIRE
190 cm
ADEQUATE MEANS OF ESCAPE IN CASE OF FIRE
MANHOLE OR OPEN DRAINAGE SHOULD BE EITHER COVERED OR CORDONED OFF
DOOR FIXTURE OR SIGN SHOULD NOT OBSTRUCT THE TRAFFIC
NO PASSAGE SHOULD BE PLACED UNDER STAIRS
NO OBSTACLES AT CHEST HEIGHT

# INFORMATION FOR MODIFYING EXISTING SCHOOL AND BUILDING NEW SCHOOLS

## 1. PLANTING

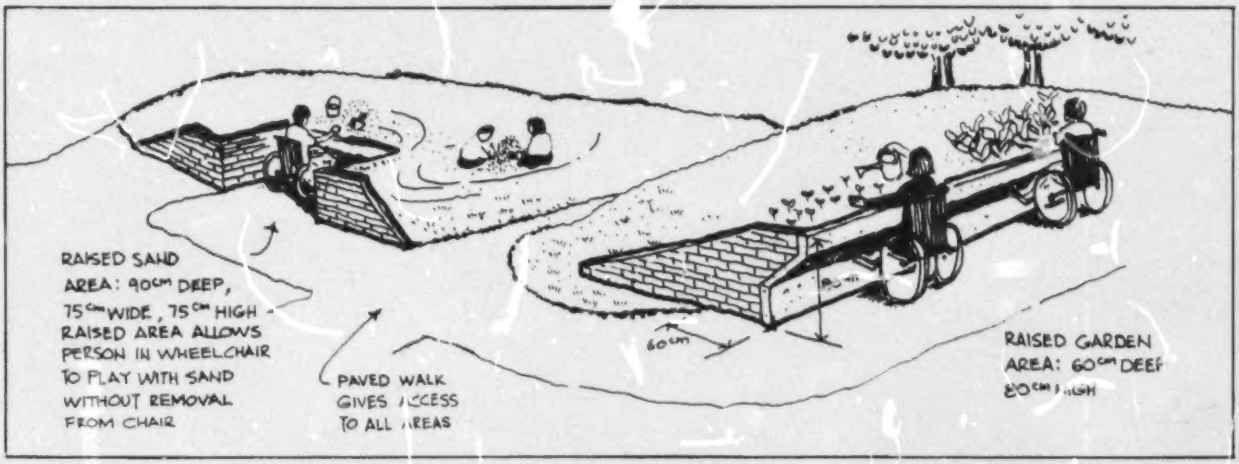
AVOID DEBRIS OR SURFACE ROOTS NEAR WALK




KEEP 2.5m VERTICAL CLEARANCE OVER WALKS OR SITTING AREA

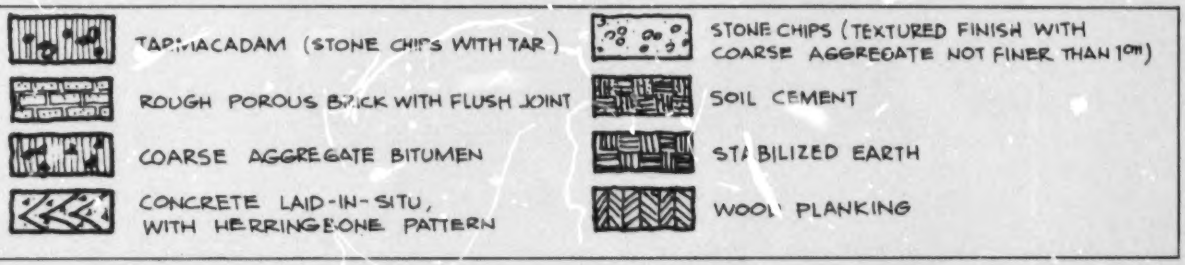
KEEP CREEPER AND GROUND-COVER OFF THE WALKWAY

## 2. GARDEN

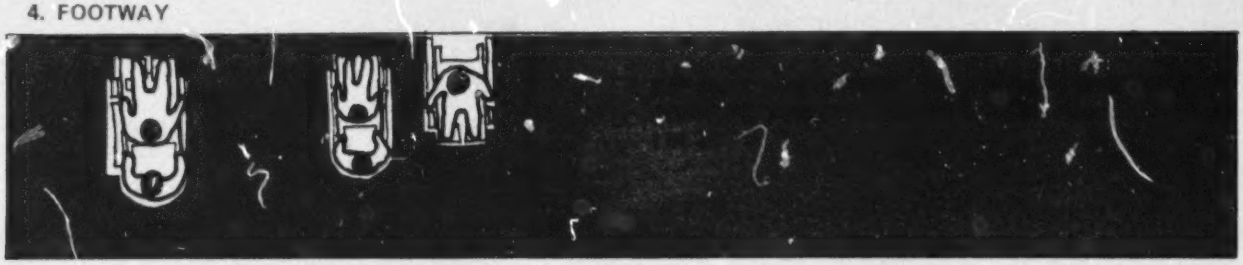

RAISED SAND AREA: 90cm DEEP, 75cm WIDE, 75cm HIGH - RAISED AREA ALLOWS PERSON IN WHEELCHAIR TO PLAY WITH SAND WITHOUT REMOVAL FROM CHAIR
PAVED WALK GIVES ACCESS TO ALL AREAS
60cm
RAISED GARDEN AREA: 60cm DEEP 80cm HIGH

## 3. RECOMMENDED SURFACE OF WALK/FLOOR

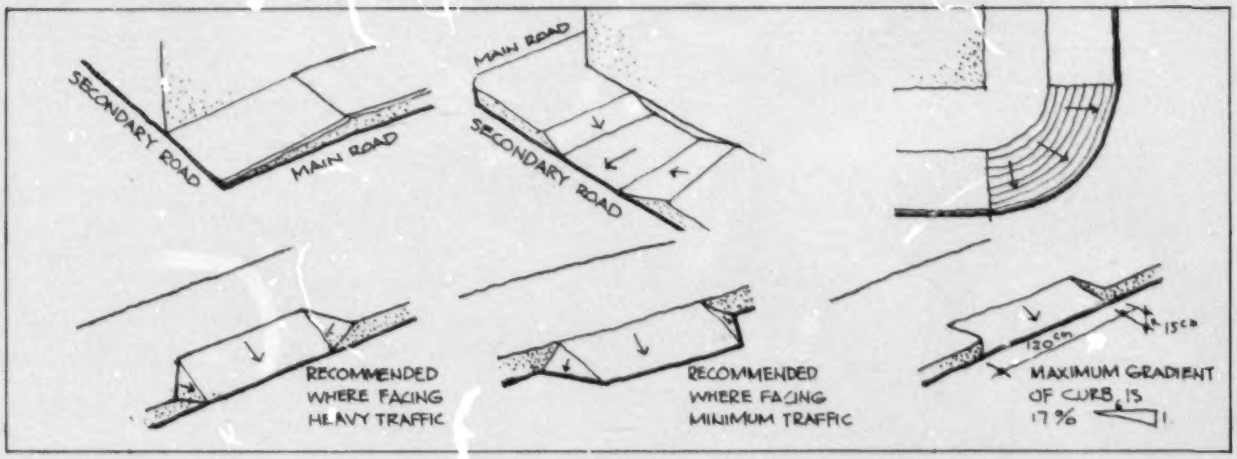
- SHOULD BE SMOOTH, BUT NON-SLIPPERY AND OF FIXED AND FIRM MATERIALS
- SHOULD NOT LOOK SLIPPERY
- FOR THE WHEELCHAIR USER, UNEVEN SURFACES DISTURB THE TRAVEL OF WHEELCHAIR CASTORS
- FOR AMBULANT DISABLED PERSONS, UNEVEN SURFACES MAY CAUSE TRIPPING AND FALLING


TARMACADAM (STONE CHIPS WITH TAR)
ROUGH POROUS BRICK WITH FLUSH JOINT
COARSE AGGREGATE BITUMEN
CONCRETE LAID-IN-SITU, WITH HERRINGBONE PATTERN
STONE CHIPS (TEXTURED FINISH WITH COARSE AGGREGATE NOT FINER THAN 1cm)
SOIL CEMENT
STABILIZED EARTH
WOOD PLANKING

## 4. FOOTWAY

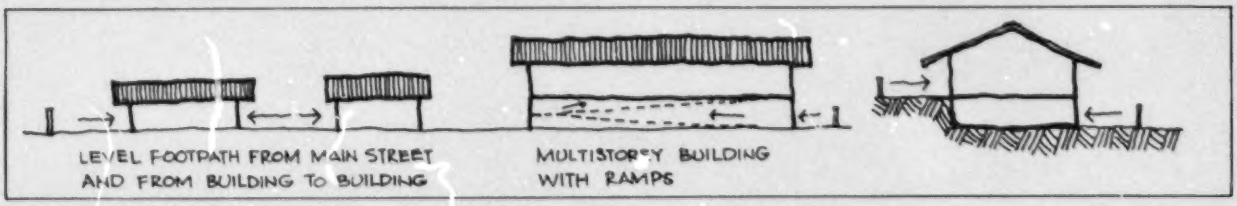


## 5. RAMPING OF SIDEWALKS

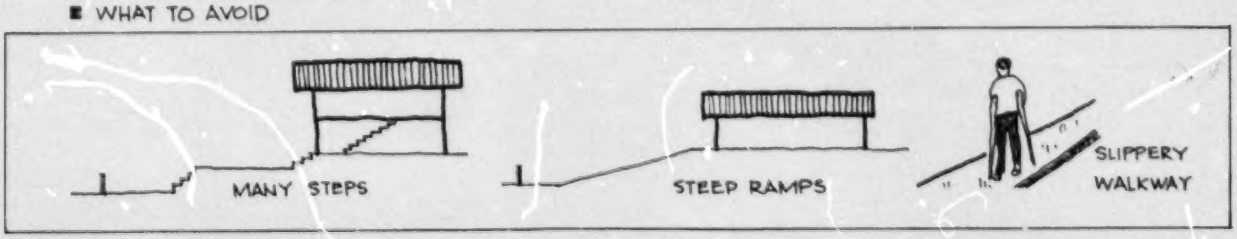



## 6. ACCESS

- EASY ACCESS FROM GATE TO BUILDING
- EASY ACCESS FROM BUILDING TO BUILDING

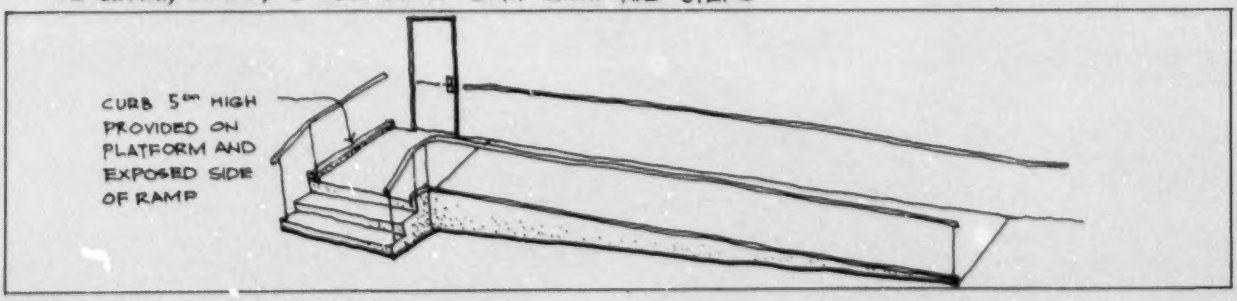



- WHAT TO AVOID

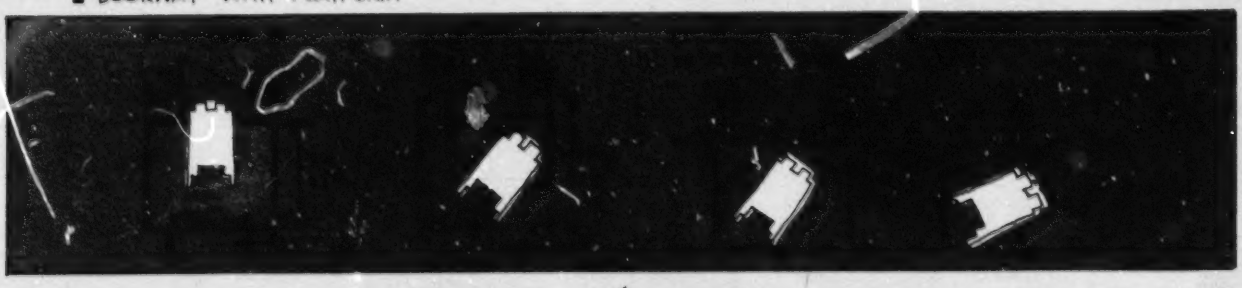



## 7. ENTRANCE AND DOORWAY

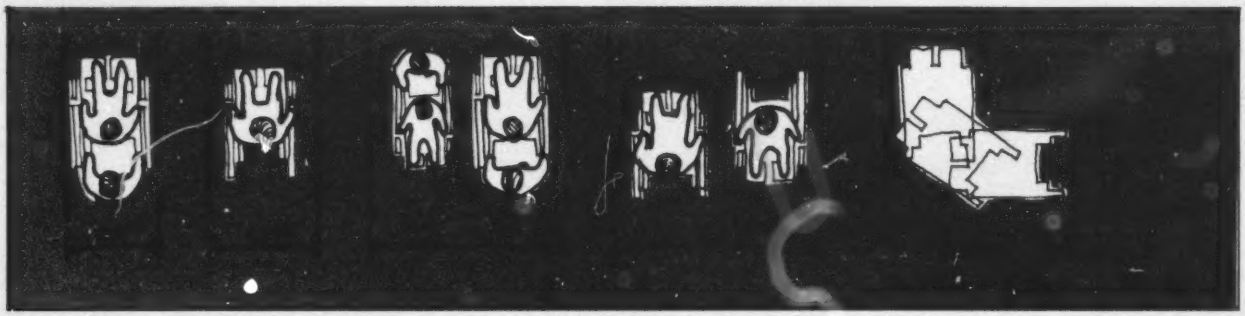
- LEVEL, IF NOT, SHOULD HAVE BOTH RAMP AND STEPS




- DOORWAY WITH PLATFORM

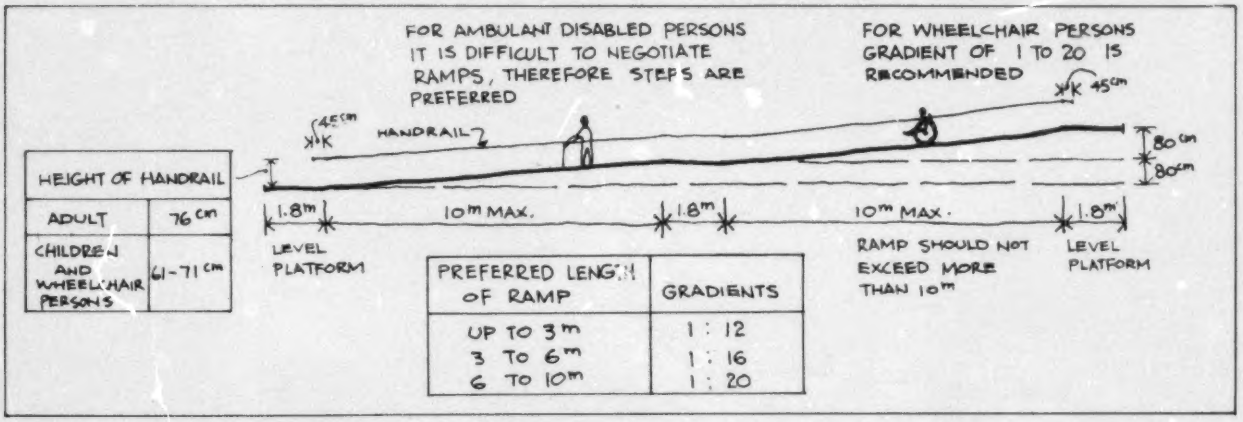


## 8. CORRIDOR



## 9. LONG RAMPS

- PREFERRED MAXIMUM GRADIENT OF 1 TO 15 IS RECOMMENDED, BUT EVEN THE STEEPEST RAMP ( GRADIENT OF 1 IN 12 ) IS MORE MANAGEABLE BY WHEELCHAIR PERSONS THAN A FLIGHT OF STEPS

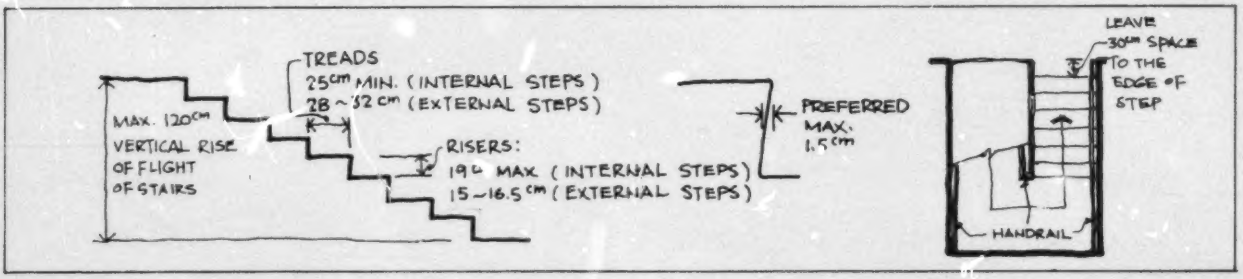



| HEIGHT OF HANDRAIL | |
|---|---|
| ADULT | 76 cm |
| CHILDREN AND WHEELCHAIR PERSONS | 61-71 cm |

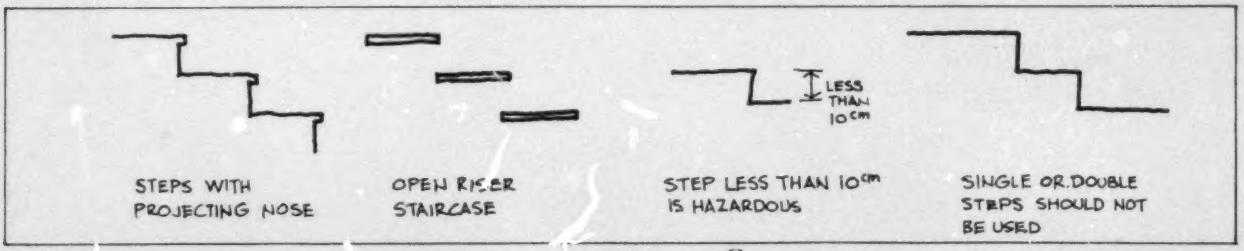
| PREFERRED LENGTH OF RAMP | GRADIENTS |
|---|---|
| UP TO 3 m | 1 : 12 |
| 3 TO 6 m | 1 : 16 |
| 6 TO 10 m | 1 : 20 |

## 10. STAIRS

- FOR AMBULANT PERSONS IT IS EASIER TO NEGOTIATE STAIRS THAN RAMPS , BECAUSE WHEN ASCENDING, THERE IS MORE CONTROL OF BODY STABILITY
- FOR WHEELCHAIR PERSONS ONLY ONE STEP CAN BE MANAGED, BUT MORE THAN TWO STEPS ARE ALMOST IMPOSSIBLE.

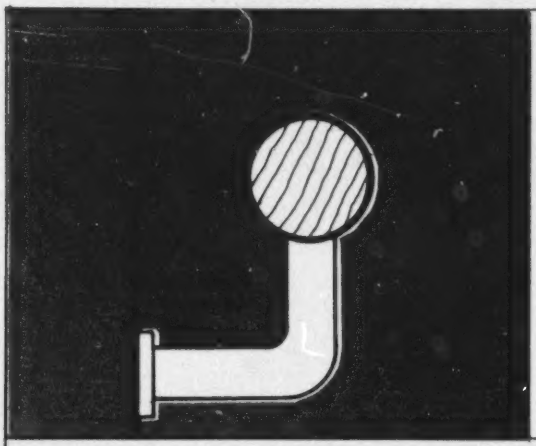

TREADS
25cm MIN. (INTERNAL STEPS)
28 ~ 32 cm (EXTERNAL STEPS)
MAX. 120cm VERTICAL RISE OF FLIGHT OF STAIRS
RISERS:
19 MAX (INTERNAL STEPS)
15 ~ 16.5 cm (EXTERNAL STEPS)
PREFERRED MAX. 1.5cm
LEAVE 30cm SPACE TO THE EDGE OF STEP
HANDRAIL

- WHAT NOT TO DO WHEN DESIGNING STAIRS

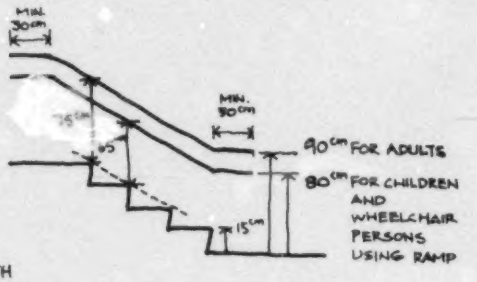

STEPS WITH PROJECTING NOSE
OPEN RISER STAIRCASE
LESS THAN 10cm
STEP LESS THAN 10cm IS HAZARDOUS
SINGLE OR DOUBLE STEPS SHOULD NOT BE USED

## 11. HAND RAILS

- AT LEAST ONE SIDE OF ANY STAIRCASE OR RAMP SHOULD HAVE A HANDRAIL
- PROVIDE HANDRAILS ON BOTH SIDES WHERE GRADING IS MORE THAN 1:12
- HANDLE AS A HAZARD INDICATOR ALONG SHORT RAMPS AND FLIGHTS OF ONE OR TWO STEPS
- A SECOND, LOWER HANDRAIL IS USEFUL TO CHILDREN AND WHEELCHAIR PERSONS



HANDRAILS ON BOTH SIDES TO ASSIST THOSE WHO CAN WALK WITHOUT A CRUTCH, BUT NEED A LITTLE SUPPORT



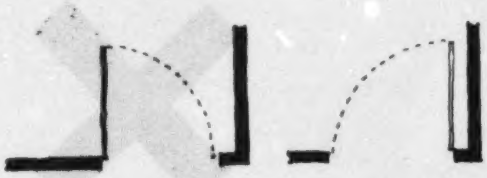

HANDRAIL CROSS-SECTIONS

ALLOW HANDS TO USE NATURAL GRIP

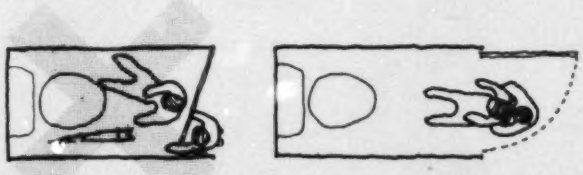
TOO WIDE FOR NATURAL GRIP

## 12. DOORS

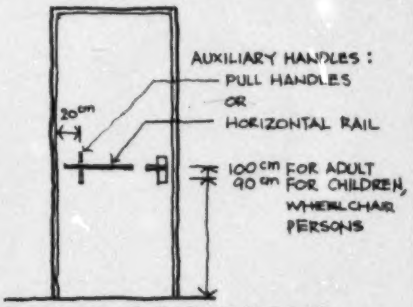
DOORWAY SHOULD HAVE A CLEAR OPENING OF 76cm CLASSROOM DOOR SHOULD ALWAYS OPEN OUT, AND SHOULD STAY FLAT ON WALL



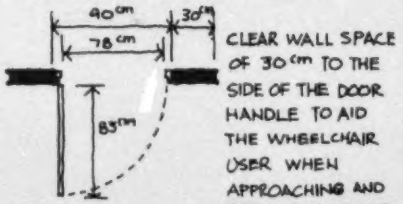
DOOR TO CORNER POSITION



DOOR TO SMALL ROOM SHOULD OPEN OUT. OTHERWISE, THERE IS A DANGER THAT IF AN INDIVIDUAL FALLS INSIDE, THE DOOR WILL BE BLOCKED

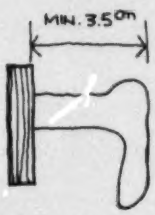



ELEVATION OF SIDE-HUNG DOOR




CLEAR WALL SPACE OF 30cm TO THE SIDE OF THE DOOR HANDLE TO AID THE WHEELCHAIR USER WHEN APPROACHING AND OPENING THE DOOR

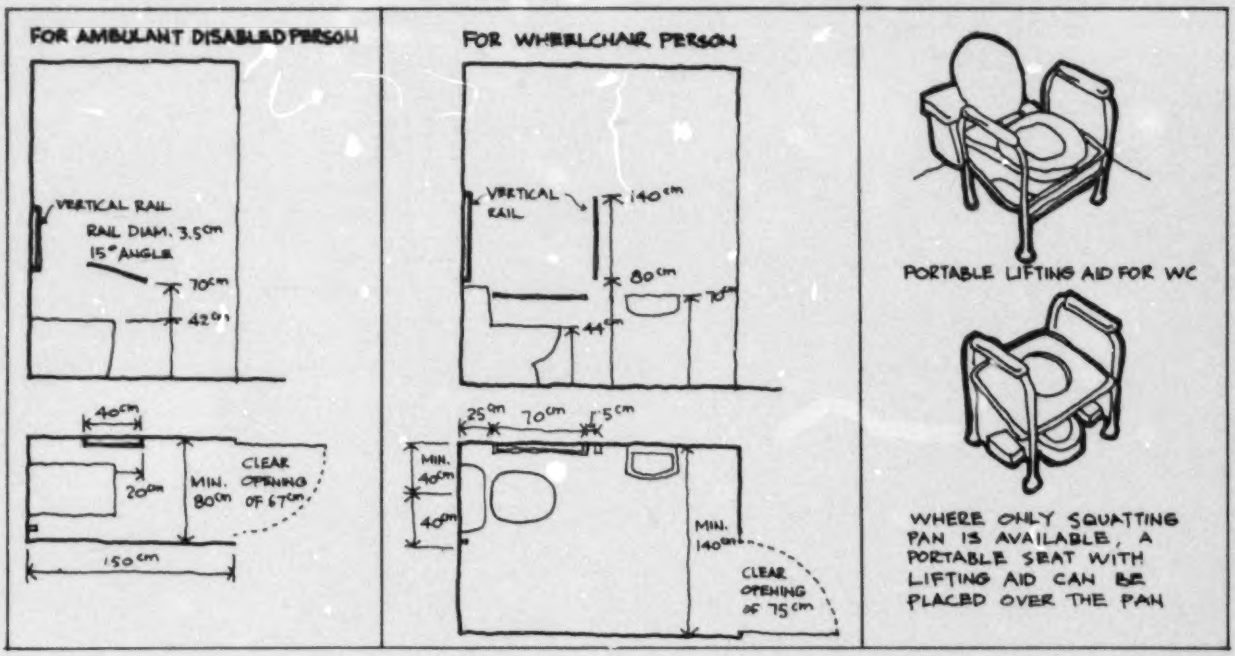
PLAN OF SIDE-HUNG DOOR




LEVER TYPE DOOR HANDLES ARE PREFERRED TO KNOBS, THEY CAN BE OPENED EASILY BY STUDENTS WHOSE GRIP IS IMPAIRED

DOOR HANDLE

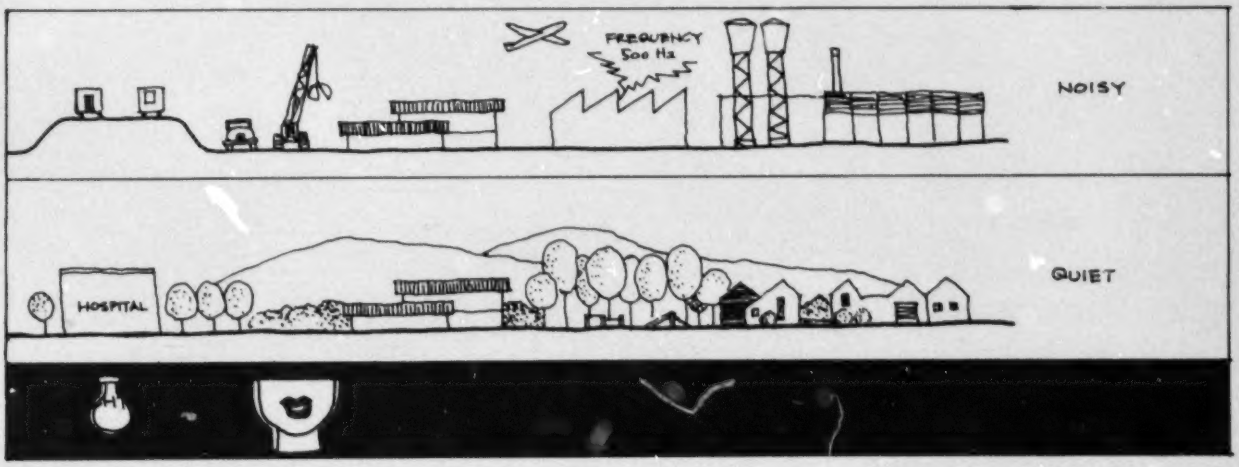
## 13. LATRINES



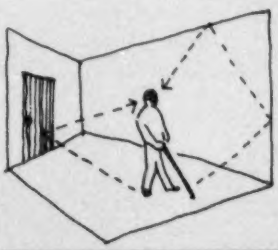

## 14. LIGHTING AND ACOUSTICS

### FOR THE HEARING IMPAIRED

- MANY HEARING-IMPAIRED PEOPLE RELY ON FREQUENCIES BELOW 500 Hz FOR SPEECH COMMUNICATION; THEREFORE, SCHOOLS SHOULD BE LOCATED AWAY FROM MECHANICAL PLANTS
- PROVIDE AMPLIFICATION OR HEARING AIDS. THESE NEED TO BE CAREFULLY CONTROLLED SO THAT THE SIGNAL IS STRONGER THAN THE BACKGROUND NOISE

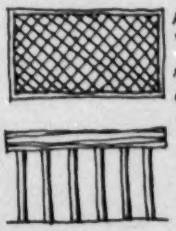



### FOR THE VISUALLY HANDICAPPED



PEOPLE GET SOME CLUE REGARDING THEIR POSITION IN A SPACE FROM ACCOUSTIC CHARACTERISTICS OF THE SPACE

UNUSUAL OBSTRUCTIONS SUCH AS COLUMNS OR PROJECTIONS SHOULD HAVE A GOOD SOUND REFLECTION



AVOID OPEN WIRE SCREENS AND OPEN GRILLS, SINCE THEY DO NOT REFLECT SOUND AND ARE DIFFICULT TO SEE

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